

WHAT IS CLAIMED IS:

5

1. An IC chip configured and arranged to be used with an MI sensor which detects an external magnetic field and outputs a sense signal, the IC chip having a rectangular shape and supplied with the sense
10 signal output from the MI element, said IC chip comprising:

an MI element connection electrode connected to said MI element; and

a switching circuit controlled by a pulse
15 signal so as to supply a pulsed magnetizing current to said MI element through the MI element connection electrode,

wherein said MI element connection electrode is located near a side of said IC chip.

20

2. The IC chip as claimed in claim 1, wherein said switching circuit is located near the side to which
25 said MI element is located.

3. An IC chip configured and arranged to be used with MI elements including first and second MI elements, the IC chip having a rectangular shape and supplied with a sense signal from each of the first and
5 second MI elements, said IC chip comprising:

a first MI element connection electrode connected to said first MI element;

a second MI element connection electrode connected to said second MI element;

10 a first switching circuit supplying a magnetizing current to said first MI element through the first MI element connection electrode; and

a second switching circuit supplying a magnetizing current to said second MI element through
15 said second MI element,

wherein said first and second switching circuits are separated from each other and located symmetrically with respect to a first diagonal line of the rectangular IC chip, the first diagonal line
20 extending between said first and second MI elements

4. The IC chip as claimed in claim 3, wherein said first and second switching circuits are located on a second diagonal line different from said first diagonal line.

5

5. The IC chip as claimed in claim 3, further comprising first and second pulse-signal generation circuits which generate pulse signals for controlling said first and second switching circuits, respectively, wherein said pulse-signal generation circuits are located at equal distances from the respective first and second switching circuits.

6. The IC chip as claimed in claim 5, further comprising a signal processing circuit which generates a detection signal corresponding to a magnitude of the external magnetic field by being supplied with the sense signals from said first and second MI elements, wherein said signal processing circuit includes a sampling

circuit and located at equal distances from said first and second switching circuits.

5

7. The IC chip as claimed in claim 6, wherein an operational timing of said sampling circuit and an operational timing of said first and second switching
10 circuits are synchronized with each other.

15 8. The IC chip as claimed in claim 6, further comprising an MI element changeover switch which switches a direction of the magnetizing current between said first and second MI elements based on a switching signal supplied from an external part, wherein said
20 pulse-signal generation circuit are commonly used for said first and second MI elements.

25

9. The IC chip as claimed in claim 6, further comprising an amplifier circuit amplifying the detection signal output from said signal processing circuit, wherein said amplifier circuit is located at a position
5 opposite to said first and second MI element connection electrodes with respect to said second diagonal line.

10

10. The IC chip as claimed in claim 9, further comprising an output circuit which outputs the amplified detection signal supplied from said amplifier circuit, wherein said output circuit is located at a
15 position opposite to said first and second MI element connection electrodes with respect to said second diagonal line.

20

11. The IC chip as claimed in claim 10, further comprising an output electrode which outputs the detection signal supplied from said output circuit to an
25 external part, wherein said output electrode is located

at a position opposite to said first and second MI
element connection electrodes with respect to said
second diagonal line.

5

12. An MI sensor comprising:

an MI element detecting an external magnetic
10 field and outputting a sense signal; and
an IC chip having a rectangular shape and
supplied with the sense signal output from said MI
element,

wherein said IC chip comprises:

15 an MI element connection electrode connected
to said MI element; and

a switching circuit controlled by a pulse
signal so as to supply a pulsed magnetizing current to
said MI element through the MI element connection
20 electrode,

wherein said MI element connection electrode
is located near a side of said IC chip.

25

13. The MI sensor as claimed in claim 12,
wherein said switching circuit is located near the side
to which said MI element is located.

5

14. An MI sensor comprising:
a first MI element detecting an external
10 magnetic field and outputting a sense signal;
a second MI element detecting an external
magnetic field and outputting a sense signal, the second
MI element being positioned at a predetermined angle to
said first MI element; and
15 an IC chip having a rectangular shape and
supplied with the sense signals from the first and
second MI elements,
wherein said IC chip comprising:
a first MI element connection electrode
20 connected to said first MI element;
a second MI element connection electrode
connected to said second MI element;
a first switching circuit supplying a
magnetizing current to said first MI element through the
25 first MI element connection electrode; and

a second switching circuit supplying a magnetizing current to said second MI element through said second MI element connection electrode,

wherein said first and second MI elements face adjacent sides of said IC chip, respectively; and

said first and second switching circuits are located at identical positions with respect to the respective first and second MI elements.

10

15. The MI sensor as claimed in claim 14, wherein said first and second switching circuits are located on a second diagonal line different from a first diagonal extending between the adjacent sides facing the first and second MI elements, respectively.

20

16. The MI sensor as claimed in claim 14, further comprising first and second pulse-signal generation circuits which generate pulse signals for controlling said first and second switching circuits,

25

respectively, wherein said pulse-signal generation circuits are located at equal distances from the respective first and second switching circuits.

5

17. The MI sensor as claimed in claim 14, further comprising a signal processing circuit which
10 generates a detection signal corresponding to a magnitude of the external magnetic field by being supplied with the sense signals from said first and second MI elements, wherein said signal processing circuit includes a sampling circuit and located at equal
15 distances from said first and second switching circuits.

20 18. The MI sensor as claimed in claim 17, wherein an operational timing of said sampling circuit and an operational timing of said first and second switching circuits are synchronized with each other.

25

19. The MI sensor as claimed in claim 17,
further comprising an MI element changeover switch which
switches a direction of the magnetizing current between
said first and second MI elements based on a switching
5 signal supplied from an external part, wherein said
pulse-signal generation circuit and said signal
processing circuit are commonly used for said first and
second MI elements.

10

20. The MI sensor as claimed in claim 17,
further comprising an amplifier circuit amplifying the
15 detection signal output from said signal processing
circuit, wherein said amplifier circuit is located at a
position opposite to said first and second MI element
connection electrodes with respect to a second diagonal
line different from a first diagonal line extending
20 between the adjacent sides facing the first and second
MI elements, respectively.

25

21. The MI sensor as claimed in claim 20,
further comprising an output circuit which outputs the
amplified detection signal supplied from said amplifier
circuit, wherein said output circuit is located at a
5 position opposite to said first and second MI element
connection electrodes with respect to said second
diagonal line.

10

22. The MI sensor as claimed in claim 21,
further comprising an output electrode which outputs the
detection signal supplied from said output circuit to an
15 external part, wherein said output electrode is located
at a position opposite to said first and second MI
element connection electrodes with respect to said
second diagonal line.

20

23. An electronic equipment comprising:
an MI sensor detecting an external magnetic
25 field and outputting a detection signal; and

a functional part using the detection signal to perform a predetermined function,

wherein said MI sensor comprising:

an MI element detecting the external magnetic
5 field and outputting a sense signal; and

an IC chip having a rectangular shape and supplied with the sense signal output from said MI element so as to output the detection signal,

wherein said IC chip comprises:

10 an MI element connection electrode connected to said MI element; and

a switching circuit controlled by a pulse signal so as to supply a pulsed magnetizing current to said MI element through the MI element connection
15 electrode,

wherein said MI element connection electrode is located near a side of said IC chip.

20

24. The electronic equipment as claimed in claim 23, wherein said switching circuit is located near the side to which said MI element is located.

25

25. An electronic equipment comprising:
an MI sensor detecting an external magnetic
field and outputting a detection signal; and
a functional part using the detection signal
5 to perform a predetermined function,
wherein said MI sensor comprising:
a first MI element detecting the external
magnetic field and outputting a sense signal;
a second MI element detecting the external
10 magnetic field and outputting a sense signal, the second
MI element being positioned at a predetermined angle to
said first MI element; and
an IC chip having a rectangular shape and
supplied with the sense signals from the first and
15 second MI elements so as to output the detection signal,
wherein said IC chip comprising:
a first MI element connection electrode
connected to said first MI element;
a second MI element connection electrode
20 connected to said second MI element;
a first switching circuit supplying a
magnetizing current to said first MI element through the
first MI element connection electrode; and
a second switching circuit supplying a
25 magnetizing current to said second MI element through

said second MI element connection electrode,

wherein said first and second MI elements face adjacent sides of said IC chip, respectively; and

said first and second switching circuits are
5 located at identical positions with respect to the respective first and second MI elements.

10

26. The electronic equipment as claimed in claim 25, wherein said first and second switching circuits are located on a second diagonal line different from a first diagonal extending between the adjacent
15 sides facing the first and second MI elements, respectively.

20

27. The electronic equipment as claimed in claim 25, further comprising first and second pulse-signal generation circuits which generate pulse signals for controlling said first and second switching circuits,
25 respectively, wherein said pulse-signal generation

circuits are located at equal distances from the respective first and second switching circuits.

5

28. The electronic equipment as claimed in claim 25, further comprising a signal processing circuit which generates a detection signal corresponding to a magnitude of the external magnetic field by being supplied with the sense signals from said first and second MI elements, wherein said signal processing circuit includes a sampling circuit and located at equal distances from said first and second switching circuits.

15

29. The electronic equipment as claimed in claim 28, wherein an operational timing of said sampling circuit and an operational timing of said first and second switching circuits are synchronized with each other.

25

30. The electronic equipment as claimed in claim 28, further comprising an MI element changeover switch which switches a direction of the magnetizing current between said first and second MI elements based on a switching signal supplied from an external part, wherein said pulse-signal generation circuit and said signal processing circuit are commonly used for said first and second MI elements.

10

31. The electronic equipment as claimed in claim 28, further comprising an amplifier circuit amplifying the detection signal output from said signal processing circuit, wherein said amplifier circuit is located at a position opposite to said first and second MI element connection electrodes with respect to a second diagonal line different from a first diagonal line extending between the adjacent sides facing the first and second MI elements, respectively.

25

32. The electronic equipment as claimed in claim 31, further comprising an output circuit which outputs the amplified detection signal supplied from said amplifier circuit, wherein said output circuit is
5 located at a position opposite to said first and second MI element connection electrodes with respect to said second diagonal line.

10

33. The electronic equipment as claimed in claim 32, further comprising an output electrode which outputs the detection signal supplied from said output
15 circuit to an external part, wherein said output electrode is located at a position opposite to said first and second MI element connection electrodes with respect to said second diagonal line.

20

25